

Remarks/Arguments:

These remarks are directed to the Final Office Action mailed on March 15, 2011, and the Advisory Action mailed on June 7, 2011. A Request for Continued Examination is submitted herewith.

Claims 8, 17-24, 34-37, and 40 are pending in the application and were examined. By this amendment, claims 8, 17, 20, 21, 24, 34, and 35 are amended, and claims 19, 22, and 40 are canceled. Support for the amendments can be found throughout the published application U.S. Pub. No. 2007/0027032, for example, at paragraphs [0046], [0052], [0053], Table 2, and Figures 1 and 2. The amendments introduce no new matter.

Response to Claim Rejections Under 35 U.S.C. § 103

Claims 8, 17-24, 34-37, and 40 stand rejected under Section 103(a) as unpatentable over WO 00/04778 to Smith ("Smith '778"), WO 01/26465 to Smith ("Smith '465"), or Prithiviraj (A host-specific bacteria-to-plant signal molecule (Nod factor) enhances germination and early growth of diverse crop plants, *Planta*, 2003, vol. 216, pp. 437-445) in view of EP 427094 to Blouin ("Blouin") or WO 01/56384 to Nonomura ("Nonomura"). Applicants respectfully traverse these rejections and submit that the present claims are patentable over the cited references, either alone or in combination, for at least the reasons set forth below.

Independent claim 8 recites, as amended:

A method for initiating early fruiting in a plant comprising the steps of:

applying to the plant a first dose of a lipochitooligosaccharide (LCO) more than 45 days after seeding at a concentration of from about 1 ng to about 1000 ng per plant; and

applying to the plant a second dose of an LCO at a concentration of from about 1 ng to about 1000 ng per plant,

under conditions effective for the plant to produce at least an equivalent amount of fruit at least one week earlier than a control plant that has been administered only one dose of an LCO.

Claim 21, the only other independent claim, is identical to claim 8, except that it is directed to a tomato plant. The claimed invention provides methods for initiating early fruiting in plants by applying multiple doses of LCOs, with the first dose applied more than 45 days after seeding.

As shown, for example, in Table 2, after plants were seeded on January 6, 2003, a first application of LCO was applied on February 21, 2003 (i.e., 46 days after seeding), and a second dose of LCO was applied on March 7, 2003 (i.e., 60 days after seeding). Plants that were treated twice with LCO had an average fruit number after two weeks that was higher than plants treated only once with LCO after an additional two weeks.

Applicants submit that Smith '778, Smith '465, Prithiviraj, Blouin, and Nonomura, either alone or in combination, fail to teach all the limitations of the claimed invention. Smith '778 is directed to methods for promoting seed germination, seedling emergence, or growth in plants by exposing the plants to LCOs (Smith '778, Abstract). With respect to the timing of an LCO application in Smith '778, seeds are either pre-treated with LCO (Smith '778, Examples 11-13) or pots are irrigated with LCO at the time the seeds are planted (Smith '778, Example 4). Smith '778 clearly fails to disclose the application of a first dose of LCO "more than 45 days after seeding" followed by the application of a second dose of LCO, as required by the present claims.

Smith '465 is directed to methods for increasing photosynthesis, growth, or yield in plants by exposing the plants to LCOs (Smith '465, Abstract). The only disclosures in Smith '465 relating to the timing of LCO applications within a particular number of "days after planting" or "DAP" are in Examples 2 and 3. Specifically, in the greenhouse experiments described in Example 2, Smith '465 states, "The following are the ages of the plants when the sprays were conducted: soybean 21 days after planting (DAP), corn 25 DAP, rice 45 DAP, melon (35 DAP) and canola 30 DAP" (Smith '465, page 21, lines 24-26). In example 3, Smith '465 describes field experiments conducted on soybean, in which LCO was applied 25 days after planting (Smith '465, page 22, lines 27-29). Smith '465 clearly fails to disclose the application of a first dose of LCO "more than 45 days after seeding" followed by the application of a second dose of LCO, as required by the present claims.

Prithiviraj is directed to the application of LCOs to corn, soybean, and *Arabidopsis thaliana* seeds (Prithiviraj, Abstract). In each experiment disclosed in Prithiviraj, the LCO is applied only once, either in a pot or Petri dish at the time of seeding, or the seeds are pre-soaked with the LCO prior to a field experiment (Prithiviraj, page 438, under "Growth chamber experiment" and "Mutant B. japonicum experiment," and page 439, under "Greenhouse experiment"). Thus, Prithiviraj also fails to disclose the application of a first dose of LCO "more

than 45 days after seeding" followed by the application of a second dose of LCO, as required by the present claims.

Blouin is directed to a delivery system for plant fertilizers that is effective for enhancing plant nutrition (Blouin, page 2, lines 19-22) and Nonomura is directed to methods and formulations for enhancing plant growth by applying conjugated indoles, or derivatives thereof, to plants (Nonomura, Abstract). Applicants first reiterate that the materials described in Blouin and Nonomura contribute directly to the actual synthesis and growth of plant tissue by incorporating the applied materials, whereas the claimed LCOs are *signal molecules* which do not serve as substrates for the generation of plant tissue, but act by activating natural plant genes; therefore, the limited teachings in Blouin and Nonomura would not lead a skilled artisan to expect that multiples doses of a *signal molecule*, such as an LCO, would lead to increased fruit number, as signal molecules are not directly involved in the actual synthesis of plant tissue. However, regardless of whether the compounds described in Blouin and Nonomura are analogous to LCOs, Blouin and Nonomura fail to make up for the deficiencies of the Smith references and Prithiviraj discussed above. Blouin states that a fertilizer material may be applied in multiple applications, "pre-bloom" and "post-bloom" (Blouin, page 4, lines 41-43, page 5, lines 30-31, page 6, lines 1-10), but fails to specify the application of nutrients within a specific number of days after seeding. Nonomura states that indoles may be applied in multiple applications "interrupted by periods of photosynthetic activity" (Nonomura, page 18, line 29) and in one example Nonomura states, "[a]llow approximately a week or more between treatments" (Nonomura, page 20, line 30). Neither Blouin or Nonomura discloses the application of a first dose of LCO "more than 45 days after seeding" followed by the application of a second dose of LCO, as required by the present claims.

In view of the limited disclosures of Smith '778, Smith '465, Prithiviraj, Blouin, and Nonomura, one of ordinary skill in the art at the time of the present invention would have had no reason to apply a first dose of LCO to a plant more than 45 days after seeding followed by a second dose of LCO. Applicants further submit that none of the prior art references are directed to treating a plant with LCOs under conditions effective for the plant to produce fruit at least one week earlier than a control plant that has been administered only one dose of an LCO, as required by the present claims.

Applicants therefore respectfully submit that the present claims are patentable over the cited references. Claims 17, 18, 20, 34, and 36 depend from claim 8, and claims 23, 24, 35,

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and 37 depend from claim 21, and are therefore also patentable over the cited references, but may be separately patentable for additional reasons as well.

Conclusion

In view of the amendments and arguments set forth above, Applicants submit that the pending claims are in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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